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16 June 2016

Version of attached file:

Published Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Ferguson, G.R. and Bacila, I.A. and Swamy, M. (2016) 'Does current provision of undergraduate education prepare UK medical students in ENT? A systematic literature review.', *BMJ open.*, 6 (4). e010054.

Further information on publisher's website:

<http://dx.doi.org/10.1136/bmjopen-2015-010054>

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BMJ Open Does current provision of undergraduate education prepare UK medical students in ENT? A systematic literature review

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To cite: Ferguson GR, Bacila IA, Swamy M. Does current provision of undergraduate education prepare UK medical students in ENT? A systematic literature review. *BMJ Open* 2016;**6**:e010054. doi:10.1136/bmjopen-2015-010054

► Prepublication history and additional material is available. To view please visit the journal (<http://dx.doi.org/10.1136/bmjopen-2015-010054>).

Received 27 September 2015
Revised 21 March 2016
Accepted 22 March 2016



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ABSTRACT

Objective: To systematically identify and analyse all published literature relating to the provision of undergraduate education for preparedness in ear, nose and throat (ENT) surgery, as perceived by medical students and clinicians in the UK.

Design: Systematic literature review.

Data sources: 5 major databases were searched: MEDLINE, EMBASE, ERIC, Cochrane and Web of Science. The literature search was conducted from February to April 2015.

Eligibility criteria for selecting studies: Primary research or studies that report on the provision of undergraduate education for preparedness in ENT, from the perspective of medical students and clinicians in the UK. The timescale of searches was limited from 1999 onwards (ie, the past 15 years).

Data extraction: The literature search was conducted by 2 independent reviewers. Search terms used involved the combination and variation of 5 key concepts, namely: medical student, clinician, ENT, undergraduate medical education and UK. A data extraction form was designed for and used in this study, based on guidelines provided by the UK National Health Service (NHS) Centre for Reviews and Dissemination. Textual narrative synthesis was used for data analysis.

Results: A total of 7 studies were included in the final review. 4 main themes were identified: confidence in managing patients, teaching delivery, student assessment and duration of rotations. A consistent finding in this review was that the majority of final year medical students and junior doctors did not feel adequately prepared to practise ENT. Important factors influencing preparedness in ENT included the duration of clinical rotations, the opportunity for hands-on learning and formal assessment.

Conclusions: The findings of this review suggest the need for further development of the ENT undergraduate curricula across the UK. However, there is insufficient evidence from which to draw strong conclusions; this in itself is beneficial as it highlights a gap in the existing literature and supports the need for primary research.

Strengths and limitations of this study

- A comprehensive literature search was carried out using five major databases.
- The review involved a diverse range of participants.
- 'Preparedness' in this review was more consistent with the level of confidence, rather than a prediction of performance.
- Only seven studies qualified for inclusion in this review.
- The use of questionnaires to collect data in each study limited the opportunity for participants to express their perspectives.

INTRODUCTION

Ear, nose and throat (ENT) is the third largest surgical specialty with related problems frequently encountered in a range of other disciplines including general practice and emergency medicine.¹⁻⁴ In general practice, for example, ENT accounts for 25% of adult and 50% of all paediatric consultations.²⁻⁴ Despite this, ENT forms only a small part of the undergraduate medical programme. According to the General Medical Council recommendations, the curriculum must help students to develop the knowledge, skills and behaviour needed for clinical practice.⁵⁻⁶ Students and clinicians have raised concerns about the provision of undergraduate education for preparedness in ENT.⁷⁻¹³ These concerns relate to a lack of confidence among final year medical students and junior doctors in dealing with common ENT problems.⁷⁻¹³

Most of the literature relating to the provision of undergraduate education for preparedness in clinical practice has focused on the general preparedness of junior doctors for starting work.¹⁴⁻¹⁹ A national survey found that over 40% of junior doctors in the UK did

not feel prepared for their first post.¹⁴ A follow-up survey showed improvement in the level of preparedness, but revealed wide variation across UK medical schools.¹⁵ A lack of preparedness has also been reported internationally, with medical students in America and Australia feeling unprepared for clinical practice.^{20–22}

Illing *et al*¹⁷ in 2013 conducted a qualitative study involving 60 graduates from three UK medical schools with different curricula to determine whether they were prepared for clinical practice. Junior doctors felt prepared in terms of communication skills and team working, but less prepared for being on-call, prescribing, managing acutely unwell patients and dealing with paperwork. This highlighted the importance of medical students having hands-on learning experience in a supervised clinical setting.

Matheson and Matheson¹⁸ in 2009 captured the views of consultants and specialist registrars working alongside junior doctors in two UK teaching hospitals. This study found that junior doctors were best prepared for communicating and asking seniors for help but less prepared in terms of clinical and practical skills, suggesting the need for further training at undergraduate level.

Tallentire *et al*¹⁹ in 2011 conducted a systematic literature review to investigate the perceived preparedness of UK medical graduates in acute care. Acute care was identified as an area of weakness by medical graduates and senior clinicians. This study highlighted the need for medical students to gain more experience in managing acutely unwell patients during their undergraduate training.

Few studies have considered the provision of undergraduate education for preparedness in ENT.^{7–13} A lack of specialty-specific understanding leaves ENT undergraduate programmes without clear guidance on how best to prepare students for clinical practice.^{8 12} This systematic review of the existing literature will form a starting point to better understand the provision of undergraduate education for preparedness in ENT, as perceived by medical students and clinicians in the UK. It is intended that the findings of this review will contribute to further development of the ENT undergraduate curricula to increase the preparedness of newly qualified doctors for clinical ENT.

Research question

How is the provision of undergraduate education for preparedness in ENT perceived by medical students and clinicians in the UK?

Objective. To systematically identify and analyse all informative, published literature relating to the provision of undergraduate education for preparedness in ENT in the UK.

METHODS

A systematic literature review was utilised in this study. Five major databases were searched: MEDLINE,

EMBASE, ERIC, Cochrane and Web of Science. The search terms used were variations of five key concepts, namely: medical student, clinician, ENT, undergraduate medical education and UK (see [table 1](#)). The reference lists of identified literature were also screened for identification of other pertinent literature. The literature search was conducted from 2 February 2015 to the 6 April 2015. Two independent researchers were involved in the selection of studies and extraction of data. Disagreements between the researchers were resolved through discussion.

A summary of inclusion and exclusion criteria is presented in [table 2](#). The timescale of searches was limited from 1999 onwards (ie, the past 15 years) in the interest of identifying the most up-to-date and relevant information. Outcome variables were not predefined in this study, considering that it is exploratory rather than hypothesis-led research. A structured appraisal tool and data extraction form were designed for and used in this study, based on guidelines provided by the UK National Health Service (NHS) Centre for Reviews and Dissemination²³ (see online supplementary appendices 1 and 2). Textual narrative synthesis was used for data analysis. This approach enabled analysis of the relationships within and between studies, as well as assessing gaps in the literature.^{24 25}

FINDINGS

One hundred and sixty-eight citations were identified from searching the electronic databases. All of the identified literature was entered into Endnote and 59 duplicates removed. A thorough review of titles and abstracts was conducted for the remaining 109 studies, of which 96 did not meet the inclusion criteria. Full-text documents were retrieved for 15 articles, including two articles that were discerned by reviewing the reference lists of relevant literature. Of these articles, eight were excluded for failure to meet the inclusion criteria. Seven

Table 1 Key word search

Search	Key words
1	Medical Student* 'OR' Phase II Student* 'OR' Undergraduate*
2	Clinician* 'OR' Doctor* 'OR' Physician* 'OR' Trainee* 'OR' Surgeon*
3	ENT 'OR' Otorhinolaryngology 'OR' Otolaryngology
4	Undergraduate Medical Education 'OR' Medical School* 'OR' Curricul* 'OR' Teaching 'OR' Learning 'OR' Programme evaluation 'OR' Clinical Confidence 'OR' National Health Service
5	UK 'OR' Great Britain
6	(1 'OR' 2) 'AND' 3 'AND' 4 'AND' 5

'OR' and 'AND' are Boolean operators.

*Indicates truncation.

ENT, ear, nose and throat.

Table 2 Summary of inclusion and exclusion criteria

	Inclusion	Exclusion
Research participant	Research relating to ENT undergraduate training in the UK	Research relating to a research participant other than ENT undergraduate training in the UK
Participants	Studies involving: 1. Medical students who have directly experienced ENT undergraduate training in the UK 2. Clinicians working in the UK	Studies involving participants other than those outlined in the inclusion criteria
Location	UK studies only	Studies outside the UK—rest of the world
Type of study	Primary research or studies that report findings relevant to the research question	Studies that report on the provision of undergraduate education for preparedness in ENT, but do not explore the perceptions of participants outlined above
Methodology	Research involving quantitative, qualitative or mixed methodology	Commentaries, editorial comments
Timescale	Research published from the year 1999 onwards (within the past 15 years)	Research published before the year 1999

ENT, ear, nose and throat.

studies were included in the final review. See [figure 1](#) for an overview of the search strategy. Baseline data of the included studies are summarised in [table 3](#).

Assessment of study quality

Weaknesses and biases

Of the studies included in this review, a number of weaknesses and biases have been identified. Five studies recruited participants by non-random selection.^{7–9 12 13} This method of selection is associated with an increased risk of sampling bias. A recurring problem was not collecting data from all UK medical schools. This is important as curriculum variation means that students' experiences may be different from one school to the next. Moreover, with the exception of Lee *et al*,¹² details about the medical schools involved in studies were not provided. All of the studies included in this review relied on questionnaires to collect data^{7–13} which limited the opportunity for participants to express their perspectives. The response rate varied greatly between studies and in general tended to be higher for those with the least number of participants. No explanation was given for why some participants chose not to participate. In some studies,^{7 9–11} the authors did not provide sufficient information in relation to their methodology such as the type of questions that participants were asked^{7 9} or the method of random selection^{10 11} and data analysis.¹⁰

Reliability and validity

In three studies, the questionnaire involved the use of a Likert scale.^{8 12 13} The items that made up these scales were inter-related, contributing to the internal reliability of the findings. In the study conducted by Khan and Saeed,⁷ the questionnaires provided a free-text option, with responses obtained from students straight reported in an online supplementary appendix. This enabled independent evaluation and avoided any subjective judgement on behalf of the authors, contributing to the

reliability of the study. However, in two studies, participants were asked to provide estimates;^{10 11} this type of questioning is associated with a high degree of subjectivity and inconsistency, reducing the reliability of the findings. Chawdhary *et al*⁹ provided insufficient details to enable proper assessment of reliability. For example, it is not clear what type of questionnaire was used or the questions that participants were asked.

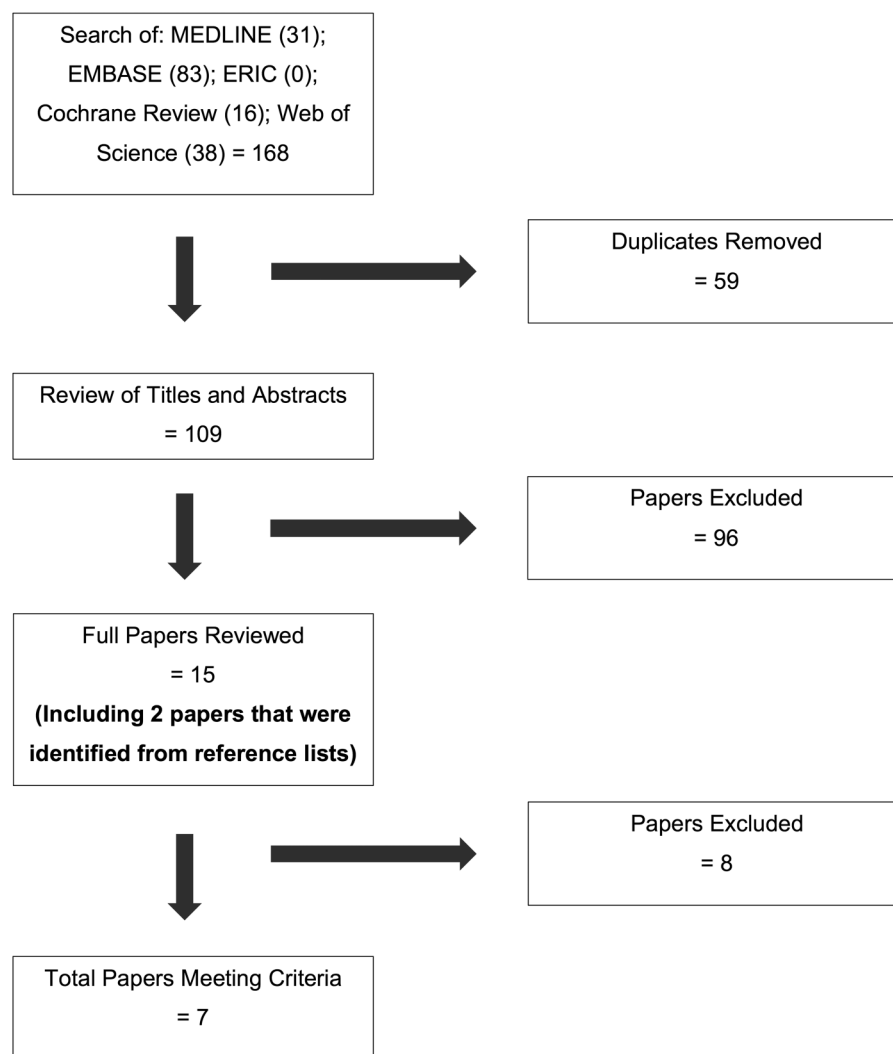
A recurrent problem was not obtaining data from all UK medical schools. This reduces the external validity of the findings. Regarding internal validity, most of the studies presented sufficient data to support their findings which involved the use of figures and tables.^{7 8 10–13} Five of the studies included in this review provided a copy of the questions that participants were asked;^{8 10–13} these appear to have good face validity based on their clarity and appropriateness.

Themes

From the studies included in this review, four main themes were identified with regard to the provision of undergraduate education for preparedness in ENT: confidence in managing patients, duration of clinical rotations, teaching delivery and student assessment.

Confidence in managing patients

Three studies have reported that the majority of final year medical students and clinicians were not confident to assess and manage ENT patients.^{8–10} Chawdhary *et al*⁹ conducted a study involving 311 final year medical students, recruited from a UK medical school after the completion of a week-long rotation in ENT. The proportion who did not feel adequately prepared to deal with common ENT symptoms and emergencies was 72% and 77%, respectively. In a study conducted by Clamp *et al*¹⁰ involving 357 general practitioners (GPs) from south-west England, over three-quarters of participants felt their ENT undergraduate training had not adequately

Figure 1 Overview of search strategy.

prepared them for clinical practice. Powell *et al*⁸ compared the confidence levels of 444 Foundation Year 1 doctors in ENT and cardiovascular medicine. A 10-point Likert scale was used to score the confidence level of participants who represented all 30 UK medical schools. This study found the median confidence of Foundation Year 1 doctors in history taking and performing clinical examinations to be significantly lower for ENT when compared with cardiovascular medicine ($p<0.001$). Similarly, the median confidence of Foundation Year One doctors in patient management was significantly reduced for ENT when compared with cardiovascular medicine ($p<0.001$). Furthermore, in the study conducted by Khan and Saeed,⁷ the opinions of 163 ENT consultants were sought. Over three-quarters of the participants felt that junior doctors were not proficient in the management of patients with common ENT problems.

Duration of clinical rotations

Participants in three of the included studies expressed a need for more ENT training in the undergraduate medical programme.^{7 8 11} Khan and Saeed⁷ included 518 students, recruited from nine UK medical schools.

Forty-seven per cent of these participants were not offered a formal ENT rotation. Of those who were, the average duration was 8 days. Over one-third of medical students who had undergone a formal ENT rotation felt that their expectations had not been met. Khan and Saeed⁷ also explored the views of consultant ENT surgeons who felt that the low level of proficiency among junior doctors was due to the limited time assigned to ENT undergraduate training and that longer rotations were needed.

Sharma *et al*¹¹ conducted a study involving 20 senior house officers working in emergency departments across the UK, representing 16 of the then 27 UK medical schools. Only eight doctors (40%) had a formal ENT rotation, with two doctors having received no ENT undergraduate training at all. The mean duration of ENT undergraduate training was 13.7 days. Three-quarters of participants felt that they had not received enough ENT training as an undergraduate. In the study conducted by Powell *et al*⁸ involving 444 Foundation Year One doctors from 30 different medical schools, the mean duration of ENT undergraduate training was 3 days of preclinical teaching and 5 days of department exposure. Sixteen per cent of respondents received no

Table 3 Baseline data of the included studies^{7–13}

Authors and date	Design	Sample size	Data collection method	Undergraduate education for preparedness in ENT	
				Perceptions of medical students in the UK	Perceptions of clinicians in the UK
1 Khan and Saeed (2012)	Mixed-method study	1. 518 medical students from 9 UK medical schools 2. 163 consultant ENT surgeons from 54 teaching hospitals	Postal and online questionnaire surveys comprised of multiple choice and free-text options	243 students were not offered a formal ENT rotation. Of those who were, the average duration was 8 days. 97 students who had undergone a formal ENT rotation felt that their expectations had not been met, with many commenting on the need for longer rotations.	Three-quarters of consultants felt that junior doctors were not proficient in patient management. This was attributed to the limited time assigned to ENT undergraduate training.
2 Powell <i>et al</i> (2011)	Quantitative study	444 Foundation Year 1 doctors, representing all 30 UK medical schools	Online questionnaire comprised of 30 closed questions	NA	The mean duration of ENT undergraduate training was 8 days. 66% felt that they had not received enough ENT undergraduate training. The median confidence of participants in history taking, examinations and patient management was significantly lower for ENT when compared with cardiovascular medicine ($p<0.001$). Participants ranked formal teaching sessions involving real ENT patients first for educational value. Consultant and middle grades scored highest in teaching delivery.
3 Chawdhary <i>et al</i> (2009)	Quantitative study (based on the reported findings)	311 final year medical students from a UK medical school	Questionnaire (type not specified)	The proportion of students who did not feel adequately prepared to deal with common ENT symptoms and emergencies was 72% and 77%, respectively. ENT clinics were scored first for educational value.	NA
4 Clamp <i>et al</i> (2007)	Quantitative study	357 GPs from south-west England	Postal questionnaire comprised of 15 closed questions	NA	Median length of ENT undergraduate training was 2.8 weeks. Three-quarters of participants (271) felt their ENT undergraduate training had not adequately prepared them for clinical practice. The proportion of participants who were satisfied with their undergraduate training rose from 24% to 33% in a subgroup who had undergone a formal examination in ENT.

Continued

Table 3 Continued

Authors and date	Design	Sample size	Data collection method	Undergraduate education for preparedness in ENT	
				Perceptions of medical students in the UK	Perceptions of clinicians in the UK
5 Sharma <i>et al</i> (2006)	Quantitative study	20 Senior House Officers recruited from different emergency departments across the UK	Telephone questionnaire comprised of 10 closed questions	N/A	8 doctors had experienced a formal ENT rotation, the mean duration of which was 13.7 days. 15 doctors felt that they had not received enough ENT undergraduate training.
6 Lee <i>et al</i> (2005)	Mixed-method study	152 fourth year medical students recruited from Dundee University	Paper questionnaire comprised of 10 questions—both open and closed	60% felt that their educational needs in operating theatre teaching had been met. On a 7-point Likert scale, the satisfaction of educational needs in operating theatre teaching was rated 3.9 (95% CI 3.7 to 4.2).	N/A
7 Hajioff and Birchall (1999)	Quantitative, prospective, non-randomised controlled study	25 medical students recruited from a UK medical school	Paper questionnaire comprised of closed questions	Student satisfaction with ENT clinics was significantly higher when they had the chance to see patients alone during longer clinic consultations ($p=0.0021$)	NA

ENT, ear, nose and throat; GP, general practitioner; NA, not available.

experience within an ENT department. Sixty-six per cent of respondents felt that they had not received enough ENT undergraduate training.

Teaching delivery

Two studies included in this review found that teaching modalities perceived by students to have the greatest educational value were not always the most commonly used ones in ENT undergraduate training.^{8 9} Chawdhary *et al*⁹ conducted a study involving 311 final year medical students who had undergone a week-long rotation in ENT. During this period, students spent most of their time in clinics, followed by self-study and then operating theatres. In terms of educational value, students ranked clinics first, tutorials second and operating theatres fifth out of six possible options. Information about the other teaching options is not available. In the study conducted by Powell *et al*,⁸ the teaching modalities that were most commonly used during ENT undergraduate training were clinics, followed by theatre sessions and then tutorials. Participants ranked formal teaching sessions involving real ENT patients first for educational value—a teaching method that was reported to be the ninth most commonly used, out of a total of 13 options. ENT clinics were ranked second and tutorials third; theatre sessions were ranked seventh for educational value.

Powell *et al*⁸ also asked participants to score the different types of personnel involved in delivering the ENT undergraduate programme, with the consultants and middle grades scoring highest.

Although students did not rank theatre sessions first for educational value, Lee *et al*¹² found that the majority of medical students perceived it to be a beneficial and important part of the undergraduate programme. In this questionnaire-based study, 152 fourth year medical students were recruited from Dundee University after completing a 2-week ENT rotation. On a seven-point Likert scale, student satisfaction of educational needs in operating theatre teaching was rated 3.9 (95% CI 3.7 to 4.2). The importance of theatre attendance as part of the ENT undergraduate rotation was rated 4.7 (95% CI 3.7 to 4.2).

In a non-randomised controlled study, Hajioff and Birchall¹³ explored factors influencing the level of student satisfaction in ENT clinics. This study involved 25 students, recruited from a UK medical school during their 2-week ENT rotation. Ninety-two per cent of students said that they liked to spend time alone with patients. Student satisfaction with clinics was reported to be significantly higher when they got to see patients alone ($74.6\pm 2.3\%$ (mean \pm SE) vs $64.2\pm 2.2\%$; $p=0.0021$).

Student assessment

Two studies reported medical students having completed their ENT undergraduate training without any formal assessment.^{8 10} In the study conducted by Powell *et al*,⁸ 30% of respondents reported no formal assessment of

their ENT knowledge and skills. Similarly, in the study conducted by Clamp *et al*,¹⁰ only 21% of ENT undergraduate programmes were found to incorporate a formal examination. However, Clamp *et al*¹⁰ also found that the proportion of participants who were satisfied with their undergraduate training rose from 24% to 33% in a subgroup who had undergone a formal examination in ENT.

DISCUSSION

This work represents the first attempt to review systematically the available evidence pertaining to the provision of undergraduate education for preparedness in ENT, as perceived by medical students and clinicians in the UK. One important aspect highlighted by this review is the paucity of evidence available in this area of interest; this limited the authors' rigour with regard to the quality of the selected studies. Nonetheless, identifying four common themes allowed the authors to collate the results in a structured manner and draw conclusions that are meant to represent a starting point for further and more robust research.

A consistent finding in this review was that the majority of final year medical students and junior doctors did not feel confident to assess and manage ENT patients.⁷⁻¹³ Consultant ENT surgeons, working alongside junior doctors, also felt they were not adequately skilled to deal with common ENT problems.⁷ There is a general perception that postgraduate trainees in disciplines such as general practice will receive formal training in ENT. However, Clamp *et al*¹⁰ found that 30% of GPs in south-west England had received no hospital experience or any form of postgraduate teaching in ENT. This problem of preparedness for ENT is not specific to the UK. A questionnaire-based study conducted by Lennon *et al*²⁶ involving 473 GPs working in Ireland found that three-quarters of the participants felt that they had not received adequate ENT training at undergraduate level. Other studies involving primary healthcare practitioners in America and Canada have found that the majority of doctors were not aware of appropriate referral indications for common ENT procedures such as tonsillectomy.²⁷⁻²⁹

Medical students and clinicians have expressed the need for longer ENT rotations at undergraduate level. This is also supported by the study conducted by Lennon *et al*²⁶ in Ireland, which demonstrated a statistically significant relationship between the length of training and the level of satisfaction of training received ($p<0.001$); the level of satisfaction increased as the length of ENT undergraduate training received increased.

Teaching sessions involving ENT patients and delivered by consultant ENT surgeons were perceived by students to have the greatest educational value.⁸⁻⁹ These findings are supported by a recent qualitative study conducted by Illing *et al*¹⁷ involving 60 newly qualified

doctors from three UK medical schools (20 from each school) with a different curricula. The opportunity for hands-on learning in a clinical environment and having a role that enabled supervised engagement with patients were identified as important factors influencing preparedness for practice. Furthermore, although theatre sessions did not rank first in educational value, students perceived this teaching method to be a beneficial and important part of the undergraduate curriculum.¹² Ravindra *et al*³⁰ in 2013 conducted a study involving 209 graduates from a UK medical school and found that providing students with the opportunity for active participation while scrubbed, irrespective of how important the task is, significantly increases their level of satisfaction. Prioritising the use of teaching methods and providers that are perceived by students to be of greatest educational value is likely to result in a higher level of satisfaction and increased preparedness for ENT.

The level of satisfaction for ENT undergraduate training was higher in a subgroup of doctors who had undergone a formal assessment in ENT.¹⁰ However, not all UK medical schools offer students a formal ENT assessment.⁸⁻¹⁰ This is supported by Evans *et al*³¹ who conducted a study involving 26 newly qualified doctors and found that the level of confidence in performing clinical skills significantly improved for those that were practised in a clinical setting and formally assessed.

Recommendations for increased preparedness in ENT

From the findings of this review, it is evident that medical students want a formal ENT rotation of more than 2 weeks duration. Nonetheless, the authors realise that it is difficult to allocate an equitable proportion of the undergraduate curriculum to a relatively 'small' specialty, particularly when competing against larger disciplines such as General Surgery and Internal Medicine. To help overcome the time constraints placed on the undergraduate curriculum, an increasing number of medical schools are adopting an integrated approach towards teaching and learning medical and surgical specialties.³² This includes the use of simulation training and online virtual learning, alongside clinical rotations.³² Employing such an approach towards ENT would not only be time effective but would provide the opportunity for hands-on learning and formal assessment, factors that are considered important in preparing medical students for clinical practice.

CONCLUSIONS

This systematic literature review provides a starting point to better understand the provision of undergraduate education for preparedness in ENT. The majority of final year medical students and junior doctors are not confident in managing patients with common ENT problems. The findings of this review suggest the need for further development of the ENT undergraduate curricula across the UK. However, there is insufficient

evidence from which to draw strong conclusions; this in itself is beneficial as it highlights a gap in the existing literature and supports the need for primary research.

Contributors GRF and IAB made a substantial contribution to the study design, data collection and interpretation of the literature; they produced the first draft of the article. MS made a substantial contribution to the original concept and design of the study, and revised of the first draft of the paper. All authors approved the final manuscript for submission.

Funding This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available.

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BMJ Open 2016 6:

doi: 10.1136/bmjopen-2015-010054

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